

Application No. 09/886,266
Amendment under 37 CFR 1.111
Reply to Office Action dated February 10, 2005
May 10, 2005

AMENDMENTS TO THE CLAIMS

Please substitute the following claims for the pending claims with the same numbers, respectively:

Claim 1 (Currently amended): A solid state imaging device, comprising:

a solid state imaging element;

a timing signal generation circuit which generates an optical black clock pulse indicating an optical black section and an enable signal indicating timing at which an output from said solid state imaging elements stops; and

a clamping means, comprising a target value setting means which sets a target value for output and an amplifier means ~~which amplifies the~~ for amplifying a difference value indicating a difference between said target value and an optical black signal obtained at a timing of said optical black clock; and which, along with feeding back said difference value, matches a signal level of said optical black section outputted from said solid state imaging element to a constant value by maintaining ~~said target value of said optical black section~~ an output of said

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amplifier means while ~~said~~ the enable signal outputted from said timing signal generation circuit is being obtained.

Claim 2 (Original): A solid state imaging device which comprises a clamping means which matches a signal level of an optical black section outputted from a solid state imaging element to a constant value, in which said clamping means comprises:

a first amplifier means which inputs the output of said solid state imaging element at one of its input terminals;

a first sampling means, which includes a switch which goes ON during said optical black section and a retention section, and which samples the output of said first amplifier means;

a target value setting means which sets a target value for output;

a second amplifier means which receives the output from said first sampling means and said target value level from said target value setting means via a low pass filter means, amplifies the difference between them, and inputs it to said first amplifier means;

a second sampling means which samples the output of said second amplifier means during a period when an output signal is

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obtained from said solid state imaging element;

a third amplifier means which amplifies the difference between an output of said second amplifier means and an output of said second sampling means; and

a switching means which connects an output terminal of said third amplifier means to said retention section of said first sampling means during a period in which no signal is being outputted from said solid state imaging element, and terminates this connection during a period in which a signal is being outputted from said solid state imaging element.

Claim 3 (Original): A solid state imaging device according to claim 2, in which said third amplifier means is a differential amplification device of the open loop type.

Claim 4 (Original): A solid state imaging device according to claim 2, in which said target value setting means comprises:

a D/A converter which converts the data of said target value to an analog signal; and

a buffer amp which impedance converts the output of said D/A converter.

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Claim 5 (Withdrawn): A solid state imaging device which comprises a clamping means which matches a signal level of an optical black section outputted from a solid state imaging element to a constant value, in which said clamping means comprises:

a first amplifier means which inputs the output of said solid state imaging element at one of its input terminals;

a first sampling means, which includes a switch which goes ON during said optical black section and a retention section, and which samples the output of said first amplifier means;

a target value setting means which sets a target value for output;

a second amplifier means which receives the output from said first sampling means and said target value level from said target value setting means via a low pass filter means, amplifies the difference between them, and inputs it to said first amplifier means;

a second sampling means which samples the output of said second amplifier means during a period when an output signal is obtained from said solid state imaging element;

a third amplifier means which amplifies the difference between an output of said second amplifier means and an output of

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said second sampling means; and

a switching means which connects an output terminal of said third amplifier means to said low pass filter during a period in which no signal is being outputted from said solid state imaging element, and terminates this connection during a period in which a signal is being outputted from said solid state imaging element.

Claim 6 (Withdrawn): A solid state imaging device according to claim 5, in which said third amplifier means is a differential amplification device of the open loop type.

Claim 7 (Withdrawn): A solid state imaging device according to claim 5, in which said target value setting means comprises:

a D/A converter which converts the data of said target value to an analog signal; and

a buffer amp which impedance converts the output of said D/A converter.

Claim 8 (Withdrawn): A solid state imaging device which comprises a solid state imaging element, and a clamping means which matches the signal level of an optical black section

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outputted from said solid state imaging element to a constant value, in which said clamping means comprises:

a first amplifier means which inputs the output of said solid state imaging element at one of its input terminals;

a first sampling means, which includes a retention section, and a switch which operates including said optical black section outside a vertical blanking period, and which samples the output of said first amplifier means;

a target value setting means which sets a target value for output;

a second amplifier means which receives an output from said first sampling means and an target value level from said target value setting means via a low pass filter means, amplifies the difference between them, and inputs it to said first amplifier means;

a second sampling means which samples the output of said second amplifier means during a period in which an output signal is obtained from said solid state imaging element;

a third amplifier means which amplifies the difference between the output of said second amplifier means and the output of said second sampling means; and

a switching means which inputs the output of said third

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amplifier means to said first sampling means during a period in which no signal is being outputted from said solid state imaging element, and inputs the output of said first amplifier means to said first sampling means during a period in which a signal is being outputted from said solid state imaging element.

Claim 9 (Withdrawn): A solid state imaging device according to claim 8, in which said third amplifier means is a differential amplification device of the open loop type.

Claim 10 (Withdrawn): A solid state imaging device according to claim 8, in which said target value setting means comprises:

a D/A converter which converts the data of said target value to an analog signal; and

a buffer amp which impedance converts the output of said D/A converter.

Claim 11 (Withdrawn): A solid state imaging device which comprises a solid state imaging element, and a clamping means which matches the signal level of an optical black section outputted from said solid state imaging element to a constant

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value, in which said clamping means comprises:

a first amplifier means which amplifies the output of said solid state imaging element;

a first sampling means which samples the output of said first amplifier means during said optical black section;

a target value setting means which sets a target value for output;

a second amplifier means which receives the output from said first sampling means and said target value from said target value setting means via a low pass filter means, amplifies the difference between them, and outputs its output to said first amplifier means; and

a switching means which operates during a period in which output is being obtained from said solid state imaging element, and which changes one of the time constant of said low pass filter means and the amplification level of said second amplifier means.

Claim 12 (Withdrawn): A solid state imaging device according to claim 10, in which:

said switching means goes into the OFF state during a period in which a signal is being outputted from said solid state

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imaging element so as to disconnect a feedback resistor from said second amplifier means, and goes into the ON state during a period in which no signal is being outputted from said solid state imaging element so as to connect said feedback resistor to said second amplifier means; and

said first sampling means does not operate during a period in which no signal is outputted from said solid state imaging element.

Claim 13 (Withdrawn): A solid state imaging device according to claim 11, in which said target value setting means comprises:

a D/A converter which converts the data of said target value to an analog signal; and

a buffer amp which impedance converts the output of said D/A converter.

Claim 14 (Withdrawn): A solid state imaging device which comprises a solid state imaging device, and a clamping means which matches a signal level of an optical black section outputted from said solid state imaging element to a constant value, in which said clamping means comprises:

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a first amplifier means;

a first sampling means which samples the output of said first amplifier means at a predetermined timing including the timing of said optical black section;

a target value setting means which sets a target value for output;

a second amplifier means which receives the output from said first sampling means and said target value from said target value setting means via a low pass filter means, and amplifies the difference between them;

a second sampling means which samples the output of said optical black section of said solid state imaging element; and
a selection means which changes over between the output of said solid state imaging element and the output of said second sampling means;

wherein said first amplifier means amplifies a differential value between an output of said second amplifier means and an output of said selection means.

Claim 15 (Withdrawn): A solid state imaging device according to claim 14, in which said selection means selects the output of said solid state imaging element during a period in

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which a signal is being outputted from said solid state imaging element, and selects an output of said second sampling means during a period in which no signal is being outputted from said solid state imaging element; and

said first sampling means operates periodically except during a vertical blanking period.